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RENIFORM NEMATODE PARASITISM OF COTTON. II.

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INTRODUCTION: The reniform nematode (*Rotylenchulus reniformis*) is probably the most underrated nematode parasite of cotton. Because the nematode does not cause the roots of infected plants to become knotted, distorted or otherwise noticeably abnormal to the unaided eye, its significance as a parasite of cotton is often overlooked. There is little doubt, however, that the nematode is able to reproduce in high numbers on cotton roots and that it is an important nematode pathogen of cotton. The reniform nematode is recognized as a serious parasite on many other crops also. Mainly because of its significance on other crops, the geographic distribution of the nematode within the U.S. is fairly well documented. A comparison of the geographic distribution of the reniform nematode with the geographic distribution of North American cotton production, suggests that the reniform nematode may be is responsible for considerably more cotton crop loss than it is given credit for.

Reniform nematode as a cotton parasite can be important to Florida cotton production. Much of South Florida and the Florida panhandle are known to be infested with the reniform nematode. Therefore, attempts at cotton production in these areas should be expected to be affected by the reniform nematode.

BIOLOGY: Unlike other nematode parasites of cotton, the reniform nematode is unique in that only the immature and mature female stages of the nematode parasitize plant roots. After the young female becomes established in the root, it continues to develop and reproduce. Fig. 1A shows a mature female reniform nematode at the root surface surrounded by a gelatinous envelope that protects the eggs. Unlike the root-knot nematode where sexual reproduction is superfluous, males play a vital role in reniform nematode reproduction. The eel-like creature coiled around the female in Fig. 1A is a male reniform nematode copulating with the female.

DESCRIPTION: The reniform nematode gets its common name from its specific scientific name (*reniformis*). If one observes reniform nematode infected roots with some magnification, one can easily see the parasitic females attached to the root surface (Fig. 1B). Close observation will reveal that the mature reniform females have a kidney-like shape; thus the derivation of the specific name (renal or reni = kidney and form = shaped). The center nematode in Fig. 1B has deposited eggs in the gel-like envelope. The eggs will hatch and the juvenile stages develop in the substrate before becoming infective at the young female stage.

The lack of root symptoms in plants infected with *R. reniformis* makes the identification of this parasite more difficult than that of root-knot nematodes. In fact, the observation of the female nematode on infected roots is the best diagnostic evidence of reniform nematode infection.

The existence of *R. reniformis* physiological races has been reported in India. In the United States researchers believe that the existence of races may partially account for the variability in associating reniform nematode with cotton crop losses.

CONTROL: Several sources of resistance to the reniform nematode have been identified in cotton. Unfortunately, the most likely source of resistance genes seems to be in species of cotton not commercially grown in the U.S. Interspecific hybridization of cotton is possible but difficult. In the past, the use of fumigant nematicides has limited the damage of the reniform nematode on cotton and also the need for a large concerted effort to incorporate the resistance into commercial upland cotton. The need for resistance has increased recently because chemical tools for nematode management have been all but eliminated and managing the reniform nematode is largely dependent upon cultural practices, especially crop rotation.

Because the reniform nematode has a broad host range, finding an acceptable crop to incorporate into a crop rotation schedule is not easy. The reniform nematode is not a prolific parasite on grasses, but it reproduces actively on other monocotyledonous plants such as banana and pineapple on which it was first identified in Hawaii. Therefore, grasses such as sorghum and corn may be introduced into a rotation schedule to reduce the soil population of the nematode to an acceptable level before returning to cotton production. Perhaps especially fortunate for potential Florida cotton producers is the possibility of incorporating certain vegetable crops into a

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rotation schedule. Pepper and watermelon, but not other melons, are resistant to the reniform nematode and they too should be considered as rotational crops.

In the short term, until reniform nematode resistant or tolerant cotton can be developed or some new nematode management technology discovered, crop rotation is probably the most promising means to reduce the soil population of this nematode. Efficient weed control practices should be included in these rotation programs because a large number of weeds in Florida are hosts of this parasite.

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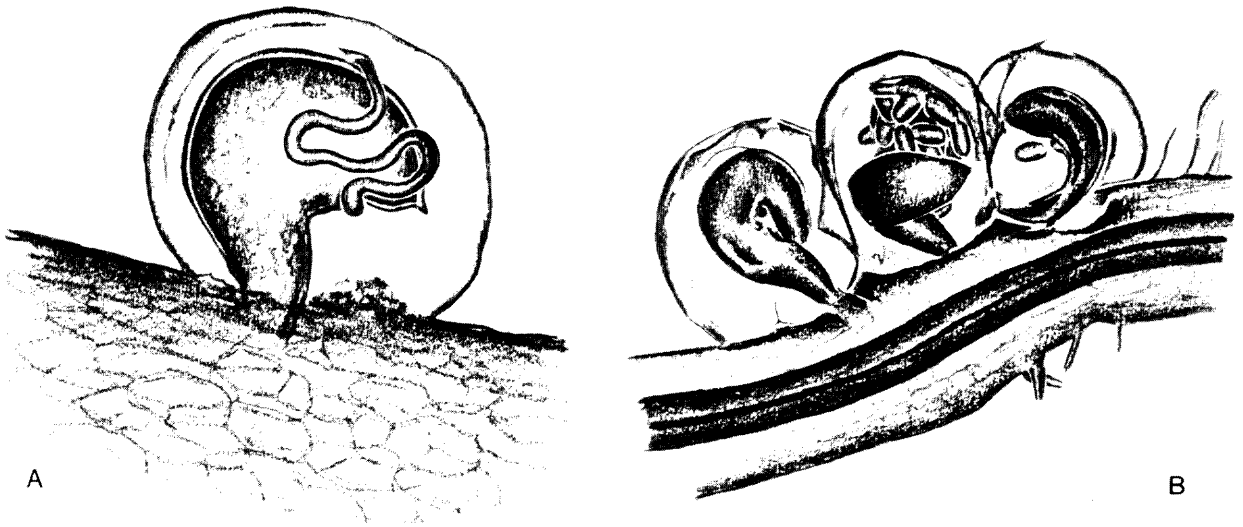

Fig. 1. Diagnostic representation of mature reniform nematode females on cotton roots. The characteristic kidney-shaped morphology of the mature female nematode is the best diagnostic evidence for reniform nematode infection. A). Note the presence of the male (large, eel-like creature) coiled around the female. B). Note the eggs deposited in the gel matrix of the center female. (With permission G. M. Watkins, (ed.) Compendium of cotton diseases, nematodes. The American Phytopathological Society).

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